

**Section 2**

**Narrative**

	Page
General Considerations.....	2-1
Functional Considerations .....	2-2
Technical Considerations .....	2-5

# Narrative

## General Considerations

### ***Current Directions***

Radiation Therapy is a clinical specialty employing Linear Accelerators and Source Radiation for the treatment of patients with cancer.

Effective diagnosis and care of cancer patients requires an interdisciplinary approach to clinical programs and involves multiple screening, diagnostic and treatment modalities.

Radiation Therapy is frequently a key component of treatment plans.

Clear, easy access and circulation (including proximity of parking) is important to outpatients, who are stressed and often weakened by their disease.

Family participation (assistance in driving, parking, helping patient in dressing room/gowned waiting areas) is a common occurrence and should be accommodated in the planning process.

Patient dignity issues should be addressed in the design of the physical environment.

Appropriate staff and support spaces and their proper functional adjacencies to each other must be clearly defined and understood early in the planning and design process in order to achieve operational efficiency.

Flexibility and adaptability should be anticipated within the design of the facility to accommodate evolving medical technology.

# Narrative

## Functional Considerations

### Services

Evaluation services include:

- Diagnostic Work-up
- Consultation
- Referral

Treatment planning services

- Diagnostic Imaging / Localization
- Simulation
- Dosimetry
- Coordination of therapies
- Physical Analysis
- Patient Blocks
- Follow-up Evaluation and Verification
- Consultation
- Referral

Therapeutic services include:

- Radiation
- Surface Treatment
- Implants
- Consultation
- Other

Therapy processes include

- Referral
- Patient Reception
- Record Initiation
- Consultation
- Patient Gowning
- Examination
- Simulation / Imaging
- Electronic and Film Image Processing
- Block Manufacturing
- Therapy Planning and Coordination of Modalities
- Repeat Patient Therapy Visits

### Level of Care

The highly specialized space criteria dictated by permanently installed equipment, and the specialized staffing requirements, demand that most radiation therapy modalities be centralized at a location most accessible to outpatients with inpatient access available.

Consolidation of services, which may include hostelry, counseling, and chemotherapy, in centers of excellence improves the quality of patient care, particularly when treatment centers may be far from patients, homes.

### Medical Records

Diagnostic evaluations generated within the department become part of the veteran's Consolidated Health Record with actual films and/or electronic data stored locally for the duration of intense patient care.

Evaluations are also communicated to the ordering physician in either hard copy or electronic form as required.

Image manipulation, interpretation, archiving, retrieval and distribution procedures occur within the Radiation Therapy Facility with intense activities in the patient treatment planning facilities which includes computerized treatment and therapy modeling techniques.

### Patient Protocol

Initial patient appointments are established through a referral network.

Multiple scheduled visits are planned over the therapy period.

Scheduled visits are included for assessment, counseling, treatment planning, therapy sessions, examination and follow-up.

### Special Requirements

Teaching facilities will require more technical support space including space to accommodate small groups in control rooms, treatment planning, consultation areas.

Coordination with related departments, facilities and program missions is required to verify space needs which may include prep, recovery, exam, and stretcher holding spaces

# Narrative

## Space Planning Issues

### **Flexibility**

The physical mass requirements to accommodate the radiation shielding place some restrictions on the location of Radiation Therapy Facilities to lower floor locations.

Shielding requirements also place demands on space since long mazes and walls from eighteen inches or more in depth usually result in departmental areas of two times the net space requirements.

Accommodations for radiation therapy gantries are the antithesis of flexible space with concrete walls which will long outlive their purpose.

Radiation Therapy Facilities need to be placed where they will not impede expansion of the surrounding services

Due to the permanent nature of these facilities they will have to be designed to requirements that are applicable to a range of equipment selections. Some over-design and anticipation of future space, service, and shielding needs are one way to provide a degree of flexibility.

The design of the Treatment Rooms needs to accommodate current and future equipment and utility access requirements.

Close coordination between the vendor, the designers and radiation therapy physicists is required in the design process.

Patient Privacy has become a very important consideration with the increasing use of VA facilities by women and families

Shared staff support, including staff lockers, lounges, inpatient holding and registration need to be considered.

Shared patient support functions are not normally used because of the nature of the patients' illness.

### **Human Factors**

Patient dignity and self-determination are primary concerns while considering operational efficiencies.

Patient's vulnerability to stress from noise, lack of privacy, poor lighting and other causes, and the harmful effects it can have on the healing process is well known and documented.

A primary goal in the design of Radiation Therapy Facilities is to address these issues and put forth creative solutions that enhance patient comfort and contribute to positive outcomes.

Surrounding the patient (and family members) with architectural finishes and furnishings that are familiar and non-threatening should be a prime objective.

Good planning and design appeal to the spirit and sensibilities of patients and care providers alike.

Radiation Therapy Facilities should be healing environments that become part of the therapy while the technical requirements are addressed in an integrated manner that supports these concepts.

Security is addressed by planning, design, and detail considerations.

Handicapped access is accommodated by the application of UFAS and ADA design standards to space and fixed equipment layouts.

## **Functional Space Relationships**

### **Work Flow**

Provide a separate, convenient Outpatient Entrance which includes patient privacy issues.

The patient process flows from registration and waiting / holding, to gowning and patient prep where required, to procedure and consulting rooms and back to waiting for release.

# Narrative

There are generally two patient care areas comprised of 1. - Treatment Planning and 2. Treatment in Radiation Therapy Treatment areas

## ***Treatment***

Planning , with assessment and evaluation which occurs in the initial visits.

Treatment in Radiation Therapy Treatment areas which are accessed repeatedly over the course of therapy.

A functional plan accommodates patient flow with a minimum of staff direction and intervention.

## **Organizational Concepts**

### ***Functional Layering***

Reception is located to control access to the patient areas and to secure the department from unauthorized access

Patient records are also usually maintained here and work orders initiated and distributed from this area.

Patient areas are consolidated to control patient access and to maintain patient privacy, security, and dignity.

Staff Support Areas which deal with film work, image manipulation and treatment modeling and consultation are consolidated in a staff work core to assure quality, staff efficacy, and patient record security.

## **Location / External Relationships**

### ***Patient Access / Wayfinding***

Radiation Therapy Facilities should be located accessible to parking.

Location with other diagnostic facilities assists in wayfinding and coordination of patient services.

Inpatient access is required.

### ***Functional Adjacencies***

Radiation Therapy benefits from, but does not require, a location generally accessible to the hospital service core(s), diagnostic services, and outpatient clinical service areas.

### ***Service Access***

General facility service access is required.

# Narrative

## Technical Considerations

### Architectural

#### Interior Materials and Finishes

##### **Partitions**

Interior partition should be primarily painted gypsum wallboard on metal studs. Partitions around consultation rooms and conference rooms should have sound attenuation batts between the studs in accordance with VA Construction Standard H-18-3, 34-1, "Noise Transmission Control".

Partitions and doors around the Simulator Room require radiation shielding. Refer to VA Construction Standard H-18-3, 64-1, "X-Ray Radiation Shielding and Special Control Room Requirements".

##### **Floors**

Floors in offices, conference rooms and waiting areas should be carpet with a 100 mm (4") high resilient base.

Floors in toilet rooms should be ceramic tile with a ceramic tile base.

Floors in exam rooms, treatment rooms and most other spaces should be vinyl composition tile with a 100 mm (4") high resilient base.

Floors in the Simulator Room and Megavoltage Radiation Therapy Treatment Room may require depressed floor areas. Coordinate these requirements with the equipment manufacturer.

##### **Ceilings**

Ceilings should be primarily lay-in acoustic ceiling tile.

##### **Protection**

Wall and corner guards should be used in corridors and other areas where wall damage from cart traffic is anticipated.

##### **Interior Doors and Hardware**

Interior doors should be 45 mm (1 3/4") thick solid core flush panel wood doors or hollow metal doors in hollow metal frames.

Doorjambes should have hospital type sanitary stops that stop 205 mm (8") from the floor to facilitate mopping. Hollow metal doors should be used where high impact is a concern and where fire rated doors are required. Kick/ mop plates should generally be applied to both sides of the doors. Handicapped accessible hardware should be used throughout.

Refer to VA Handbook PG-18-14, "Room Finishes, Door and Hardware Schedule" for additional information.

### Radiation Therapy Treatment Unit

The treatment unit is housed in a reinforced concrete, radiation shielding vault and maze. The vault is entered through a special electro-pneumatic operated neutron shielded door. The configuration of the maze and vault, and the types and thicknesses of shielding materials shall be as prescribed by a registered radiological physicist approved by the American Board of Radiology in accordance with the National Council of Radiation Protection standards and regulations reports 49 and 50 as appropriate.

### Equipment

##### **Casework**

Casework systems should be chosen that provide flexibility for planning and utilization purposes.

Casework systems should incorporate components dimensioned for ease of multiple re-use installation applications.

Casework systems should be planned avoiding corner installations and filler panel instances.

# Narrative

## **Information Management Systems**

Information Management Systems shall include elements of image retrieval / processing / storage, treatment planning, patient registrations, patient charges, Physicians order entry, and patient / staff movement.

These systems elements will require access to the main facility's "information backbone" as well as the departmental local area network. All components should be planned for compatibility.

## **Radiation Therapy Systems**

Radiation Imaging Systems requirements are defined in VA Handbook 7610, Space Planning Criteria Chapter 277 - Radiation Therapy Service.

## **Film Processing**

Film processing requirements will vary for each facility. Design criteria for "cut film", "digital laser" and the integrated use of Picture Archiving and Communications Systems, (PACs) will be as directed by VA program officials.

## **Heating, Ventilation and Air Conditioning**

### **Operation**

Air conditioning systems should be provided to heat, cool and ventilate the individual space, as required to satisfy the VA design criteria.

The air conditioning systems serving the Radiation Therapy Service should be designed to operate to the requirements of the engineering control center.

Additionally, the air conditioning systems serving the Radiation Therapy Services should be equipped with either waterside or airside economizer type. Climate often dictates which economizer type should be considered.

### **Capacities**

The number of people and the air conditioning load noted on the room design standard sheet is for purpose of establishing a basis for design planning.

The engineers/designers should verify the actual number of people and the air conditioning load to agree with the project requirements.

The percent of outside air should be based on the space total supply air quantities which will have to be coordinated with the equipment vendor.

## **Air Quality and Distribution**

In general, clean areas shall have positive air pressure and soiled areas should have negative air flow with respect to the adjoining areas.

Corridors should not be used to supply or to exhaust/return air from rooms. Corridor air may be used to ventilate open waiting rooms, bathrooms, toilet rooms, hacs and utility closets opening directly on corridors. Exfiltration from positive/negative pressure rooms that exit to a corridor should be considered part of that corridor air supply or return/exhaust.

The transferred air required to maintain an area negative or positive is listed in the room design standard sheet.

The transfer air nevertheless, should not be less than 50 CFM and no more than 150 CFM per undercut door.

Care should be taken to minimize the short circuiting of air between supply and return/exhaust openings in interior spaces.

## **Exhaust System**

A dedicated exhaust system should be provided for all hoods located in the Radiation Therapy Service. Additionally, we recommend that the supply diffusers be located as far away from the hood sash opening as possible, and its selection be based on very small throw (Oversized perforated diffuser is recommended).

# Narrative

## **Seismic**

Where required, the HVAC systems should be installed with seismic provisions as outlined in the VA HVAC Design Manual for Hospital Projects.

Refer to VA Handbook PG-18-03 (CD-54), "Natural Disaster Resistive Design Non-Structural" for additional information.

## **Noise Level**

Air distribution devices such as air outlets and inlets, terminal units and ductwork air velocity must be selected to achieve specific noise levels in accordance with the VA HVAC Design Manual for Hospital Projects.

## **Plumbing**

### **Water and Waste Systems**

The plumbing systems should be provided to satisfy the departmental plumbing needs.

The department domestic cold water should be piped to all plumbing fixtures and equipment requiring this utility.

The department domestic hot water should be piped to all plumbing fixtures and equipment requiring this utility. A hot water return system should be provided to ensure the design temperature at the farthest outlet.

The department plumbing fixtures and drains should be drained by gravity through soil, waste and vent stacks. In addition, the department special waste should be drained through corrosion resistance flame retardant piping into either a local or centralized acid dilution tank.

### **Medical Gas Systems**

The department medical gases outlets are shown to establish the basis of design guide and its use in planning. The engineers/designers shall verify the medical gases location and quantities for individual projects.

## **Seismic**

Where required, the plumbing and medical gases systems should be installed with seismic provisions as outlined in the VA Plumbing Design Manual for Hospital projects.

Refer to VA Handbook PG-18-03 (CD-54), "Natural Disaster Resistive Design Non-Structural" for additional information.

## **Electrical**

### **Illumination**

Illumination is typically provided utilizing recessed fluorescent luminaries with acrylic prismatic lenses. The fixtures typically use F32T8 lamps in compliance with the National Energy Policy Act of 1992. Lamps have a minimum color rendering index (CRI) of 85 and a color temperature of 4100 degrees Kelvin (K), which is close to the "cool white" color temperature of 4150 degrees K.

Lighting intensities conform to the VA design criteria, the IES Lighting Handbook and IES publication CP-29, "Lighting for Health Care Facilities". IES CP-29 is currently being updated and will be replaced by IES Recommended Practice RP-29 in the future.

Lighting is typically controlled by wall mounted switches located at the entrance to the room. Larger spaces may utilize multiple switching by separate switches for lighting of individual zones or areas.

Power load densities for lighting are listed for use by the mechanical HVAC load calculation purposes. Load densities should be verified for the actual design, as they may vary depending on the room configuration, fixture types, lamps and ballasts used.



# Narrative

## Power

General purpose duplex receptacles are typically provided on each wall of a room or space.

Dedicated duplex or special receptacles are provided for selected pieces of equipment such as refrigerators.

Workstations with personal computers (PC's) are typically provided with quadruplex receptacles for the PC, monitor and printer.

Junction boxes are provided for equipment requiring a hardwired connection.

Certain modular casework units are provided with a utility access module with surface mounted electrical strip mold which provides a chase for wiring. Conduits and junction boxes are provided to connect to the utility access module for power wiring.

Duplex receptacles on the critical branch of the emergency power system are provided for selected pieces of equipment such as refrigerators to allow for limited operation during a power outage.

## Security (not used)

## Life Safety

### Purpose

The life safety program should be developed to provide a reliable system to protect the building occupants, firefighting personnel, building contents, building structure and continuity of building function. Its intent should be to provide a reasonable level of fire safety by reducing the probability of injury, loss of life or building function changes due to a fire. This can be accomplished by limiting the development and spread of a fire emergency to the area of origin and reducing the need for total occupant evacuation.

The design aspects of the facility which relate to the fire and life safety include:

- Structural fire resistance
- Building compartmentation
- Fire detection, alarm and suppression
- Smoke control and exhaust
- Firefighter access and facilities
- Emergency power

New hospital construction and renovated areas of existing facilities are required to be fully protected by an automatic fire suppression system.

The minimum width of corridors and passageways in areas is 1115 mm - (44" ), in areas to be used only by staff. The minimum width of corridors in areas that will be used by inpatients is 2440 mm (96"). All patient corridors also require handrails both sides.

The Life Safety Code now permits Nurses' Stations and Waiting Areas to be open to the corridor.

Refer to the latest editions of NFPA 101 "Life Safety Code", the Uniform Building Code and additional standards published by the National Fire Protection Association (NFPA).

## Energy Conservation

All air conditioning systems that are considered, should be compared to a basic system with respect to both life cycle cost and energy usage.

The basic system should be that system having the lowest cost. The systems with the lowest life cycle cost should be selected.

Refer to VA HVAC Design Manual for Hospital projects for additional information.

# Narrative

## Communications

### **Telephone**

Telephone outlets are typically provided at each workstation or in each room. Desk outlets are 455 mm (18 ") AFF and wall phone outlets are 1200 mm ( 48") AFF.

Certain modular casework units are provided with a utility access module that house communication outlets and provide a chase for cabling. Conduits and junction boxes are provided to connect to the utility access module for telephone service.

### **Automatic Data Processing (ADP)**

ADP or computer outlets are typically provided at each workstation with a personal computer (PC) and or printer. Desk outlets are 455 mm (18") AFF.

Certain modular casework units are provided with a utility access module that house communication outlets and provide a chase for cabling. Conduits and junction boxes are provided to connect to the utility access module for ADP service. .

## Waste Management

### **Medical Waste**

Medical waste is generated in exam and treatment spaces and in soiled equipment work areas where it is bagged, collected and transported to the soiled utility rooms where it is held in separate containers until transport to the medical waste handling facility.

### **General Waste**

General Waste is generated in all spaces and is held in containers for collection and sorting into carts or it is bagged and placed in a waste holding area and transported to the waste handling facility.

### **Recycling**

Methods for sorting, collecting, transporting and disposing of recyclable products must be specifically analyzed for each facility and location.

The optional use of disposable and reusable products is an important consideration in recycling and waste disposal alternatives.

### **Soiled Linen**

Soiled reusable linens are generated in exam rooms, treatment spaces and patient and staff gowning areas and are collected in carts or hampers (depending on volume) in the soiled utility rooms or they are bagged and transported to (a) central collection area(s) via soiled linen chutes.

Disposable linens are include with general recyclable waste or medical waste as appropriate.

### **Utensils and Reprocessed Items**

Includes but is not limited to reusable utensils, including bed pans, urinals, emesis basins and other stainless steel items that are used in exam and treatment areas and transported to the soiled utility room to be reprocessed if steam washers are available. If steam is unavailable they are transported to the Sterile Processing Department for reprocessing.

### **Space Requirements**

Space requirements will vary with the selection of waste collection and recycling methods and systems. The requirements need to be analyzed for each optional method or system considered for both new and existing facilities.

# Narrative

## Transportation

### **Outpatient**

Provide convenient and wheelchair access from patient parking and primary care entrance.

Provide passenger elevator access to Radiation Therapy facilities located off main entrance levels.

Use techniques including clear access routes, public spaces, landmarks and signage to facilitate wayfinding.

### **Inpatient**

Provide access for stretcher and wheelchair patients from inpatient areas. This may require lifts or elevators to some areas.

### **Staff**

Provide staff access separated from patient waiting and holding areas.

Locate staff lounge and locker areas away from inpatient and outpatient traffic.

### **Records**

Provide separate Film File Storage and Tumor Registry Files as required - see Va Handbook 7610, Chapter 277, Radiation Therapy Service.

### **Specimens**

Specimens may be collected locally in procedure rooms and transported to the pathology lab as required.

### **Pharmaceuticals**

Pharmaceuticals including narcotics are transported by pharmacy personal to the department in locked carts.

Narcotics are delivered to a narcotics locker which is usually located in a clean supply or patient prep area and remotely alarmed.

### **Materials**

Clean supplies are transported by carts which are stored in the Clean Supply Room.

Supplies are transported by Service Elevator and through hospital corridors separated from patient traffic where possible.

### **Linen**

Disposable linens are delivered as part of clean supplies.

### **Sterile Supplies**

The delivery of sterile supplies for special procedures is accomplished by prepackaged items delivered with clean supplies.

### **Food**

Meal and Nourishment deliveries to Radiation Therapy are not required.

### **Waste**

Waste is collected by housekeeping staff and transported to the Soiled Utility Room where it is disposed as indicated in Paragraph J. Waste Management in this narrative.